

Claims

What is claimed is:

1. A method of detecting errors in transferred data comprising steps of:
 - 5 receiving transferred data having an error detection code with a first symbol size and an error correction code having a second symbol size different from the first symbol size appended to user data;
 - calculating a transformed error detection code syndrome;
 - calculating a recomputed error detection code syndrome;
 - 10 comparing the recomputed transformed error detection code syndrome to the transformed error detection code syndrome; and
 - if the recomputed transformed error detection code syndrome corresponds to the transformed error detection code syndrome, transferring the data to a host.
- 15 2. The method of claim 1 further comprising steps of:
 - if the recomputed transformed error detection code syndrome does not correspond to the transformed error detection code syndrome, receiving the data again.
- 20 3. The method of claim 1, wherein the transformed error detection code syndrome recomputation step comprises steps of:
 - computing a correction pattern using a Chien search in conjunction with Forney's algorithm
 - recomputing the transformed error detection code syndrome using Horner's algorithm.
- 25 4. The method of claim 1, wherein the transformed error detection code syndrome calculating step comprises steps of:
 - generating an error detection code multiplier;
 - 30 generating a non-transformed error detection code syndrome; and
 - multiplying the error detection code multiplier by the non-transformed error detection code syndrome.

6. The method of claim 1 wherein the step of calculating a recomputed transformed error detection code syndrome is performed only if the transformed EDC syndrome is nonzero.

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7. The method of claim 6 wherein if the transformed EDC syndrome is zero, then the transmitted data is transmitted to the host.

8. A method of detecting an error in error correction code (ECC) interleave encoded data comprising steps of:

receiving ECC interleave encoded data;

transforming the data in a transformed error detection code (EDC) syndrome

5 generator into a transformed error detection code syndrome;

receiving the ECC interleave encoded data in a recomputed transformed error detection syndrome generator;

generating a recomputed transformed error detection syndrome associated with a computed correction pattern in the ECC interleave encoded data; and

10 comparing the transformed EDC syndrome with the recomputed transformed error detection syndrome.

9. The method of claim 8 further comprising a step of:

locating errors either in the received data using an error locator; and

15 correcting errors in the received data using an error evaluator.

10. The method of claim 9 wherein the locating step comprises performing a Chien search using the received data and the evaluating step comprises performing Forney's algorithm.

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11. The method of claim 8, wherein the transforming step comprises:

generating a non-transformed EDC syndrome;

computing an EDC multiplier; and

multiplying the non-transformed EDC syndrome by the EDC multiplier to

25 generate the transformed EDC syndrome.

12. The method of claim 11, wherein the step of generating a non-transformed EDC syndrome generator comprises:

receiving the data;

30 providing clocked flip-flops;

multiplying an output of the flip-flops with a value associated with the error detection code in the received data; and

logically adding the multiplied output to the received data.

13. The method of claim 8 further comprising steps of:
generating an error correction code (ECC) syndrome from the received data in an
ECC syndrome generator.

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14. The method of claim 13 wherein the ECC syndrome generator is
connected to a comparator through an error correction unit.

15. The method of claim 14 wherein the error correction unit is connected
10 to the comparator through an EDC syndrome recomparator.

16. A method for encoding data with an error correction code and error detection code comprising:

generating an error correction code for data using a first symbol size; and
generating an error detection code for the data using a second symbol size

5 different from the first symbol size.

17. The method according to claim 16 wherein the first symbol size is h-bits and the second symbol size (g-bits) is twice the first symbol size.